Amended claims

1. A polyurethane (A) comprising as synthesis components

a) at least one organic diisocyanate or polyisocyanate,

b) at least one compound containing at least one isocyanate-reactive group and at least one free-radically polymerizable unsaturated group and/or cationically polymerizable group,

c) at least one compound containing at least one isocyanate-reactive group and at least one capped amino group and having a molecular weight below 1000 g/mol,

d) if desired, at least one compound containing at least one isocyanate-reactive group and at least one actively dispersing group,

e) if desired, at least one compound containing at least two isocyanate-reactive groups, and

f) if desired, compounds other than a) to d) containing at least one isocyanate-reactive group, the allophanate fraction being 5 to 65 mol% based on the lowest molecular weight allophanate molecule.

2. A polyurethane (A) comprising as synthesis components

a) at least one organic diisocyanate or polyisocyanate,

b) at least one compound containing at least one isocyanate-reactive group and at least one free-radically polymerizable unsaturated group and/or cationically polymerizable group,

c) at least one compound containing at least one isocyanate-reactive group and at least one capped amino group and having a molecular weight below 1000 g/mol,

d) 1-30 mol% of at least one compound containing at least one isocyanate-reactive group and at least one actively dispersing group,

e) if desired, at least one compound containing at least two isocyanate-reactive groups, and

f) if desired, compounds other than a) to d) containing at least one isocyanate-reactive group.

3. A polyurethane (A) comprising as synthesis components

a) at least one (cyclo) aliphatic organic diisocyanate or polyisocyanate,

b) at least one compound containing at least one isocyanate-reactive group and at least one free-radically polymerizable unsaturated group and/or cationically polymerizable group,

c) at least one compound containing at least one isocyanate-reactive group and at least one capped amino group and having a molecular weight below 1000 g/mol,

d) if desired, at least one compound containing at least one isocyanate-reactive group and at least one actively dispersing group,

e) no compound containing at least two isocyanate-reactive groups, and

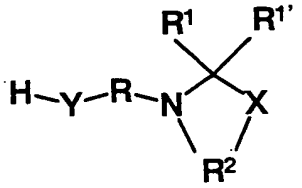
f) if desired, compounds other than a) to d) containing at least one isocyanate-reactive group.

4. The polyurethane (A) according to any of claims 1 to 3, wherein synthesis component c) has a molecular weight below 750 g/mol.

5. The polyurethane according to any one of the preceding claims, comprising per 100 g of compound at least 0.01 mol of unsaturated free-radically or cationically polymerizable groups and/or at least 0.01 mol of capped amino groups.

6. The polyurethane according to any one of the preceding claims, wherein capped amino group is selected from the group consisting of open-chain aminals, cyclic aminals, ketimines, aldimines, N,O-acetals, N,O-ketals, carboxamides, sulfonamides, and amidines.

7. The polyurethane according to any one of the preceding claims, wherein component c) has the formula (I)



(I)

where

R and R^2 independently are each a divalent organic aliphatic, cycloaliphatic or aromatic radical containing 2 to 20 carbon atoms which is unsubstituted or substituted by functional groups, aryl, alkyl, aryloxy, alkyloxy, halogen, heteroatoms and/or heterocycles,

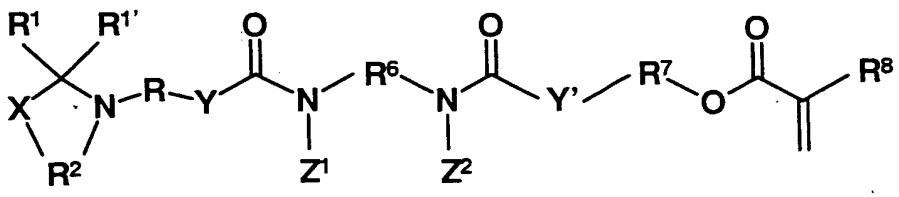
R^1 and $R^{1'}$ independently are each hydrogen, C_1–C_{18} alkyl, C_2–C_{18} alkyl which is uninterrupted or interrupted by one or more oxygen and/or sulfur atoms and/or by one or more substituted or unsubstituted imino groups, or are each C_6–C_{12} aryl, C_5–C_{12} cycloalkyl or a five- or six-membered heterocycle containing oxygen, nitrogen and/or sulfur atoms, it being possible for each of said radicals to be substituted by functional groups, aryl, alkyl, aryloxy, alkyloxy, halogen, heteroatoms and/or heterocycles,

X is oxygen (-O-), unsubstituted or monosubstituted nitrogen (-N(R^4)-) or >N-NR^4R^5,

Y is oxygen (-O-), unsubstituted nitrogen (-N(H)-) or sulfur (-S-), and

R^4 and R^5 independently are each hydrogen or C_1-C_4 alkyl.

8. The polyurethane according to any one of the preceding claims, comprising at least one of the following compounds of the formula (II)



or higher homologs thereof,

where

R, R^1, $R^{1'}$, R^2, X and Y are as defined in claim 7,

Y' can be as defined for Y but can also be different,

R^6 and R^7 each independently are a divalent organic aliphatic, cycloaliphatic or aromatic radical comprising 2 to 20 carbon atoms and unsubstituted or substituted by functional groups, aryl, alkyl, aryloxy, alkyloxy, halogen, heteroatoms and/or heterocycles,

R^8 is hydrogen, methyl, ethyl or hydroxymethyl, and

Z^1 and Z^2 can be identical or different and independently of one another are hydrogen or $-(CO)-NH-R^6-NCO$.

9. A polyurethane dispersion comprising

(A) a polyurethane according to any one of the preceding claims and including synthesis component d) and

(C) if desired, one or more photochemically and/or thermally activable initiators, and

(D) if desired, further, typical coatings additives.

10. A coating composition comprising

either at least one polyurethane dispersion according to claim 9

or at least one polyurethane (A) according to any one of claims 1 to 8 and also

(C) if desired, one or more photochemically and/or thermally activable initiators, and

(D) if desired, further, typical coatings additives.

11. A method of coating a substrate, which comprises radiation curing a substrate coated with a material according to any one of the preceding claims and subjecting it to thermal

treatment at temperatures up to 160°C.

12. The method according to claim 11, wherein the thermal treatment takes place between 60 and 160°C.

13. The method according to either of claims 11 and 12, wherein the radiation curing is conducted under inert gas.

14. The use of a polyurethane according to any one of claims 1 to 8 in a radiation-curable coating composition.

15. The use of a material according to any one of claims 1 to 10 to coat wood, metal or plastic.

16. The use of a material according to any one of claims 1 to 10 in an automotive paint or automotive topcoat material.